Monthly Review

Federal Reserve Bank of Boston

January 1954

HAULING PULPWOOD IN MAINE (Great Northern Paper Company photo, courtesy of American Forest Products Industries, Inc.)

HARDWOOD PULP
Brightens the New England Paper Industry's Future

By EDWARD D. GRUEN[1]

How important are New England's hardwoods to its pulp and paper industry and will their importance increase or decrease in the future? Has the industry taken advantage of its opportunities to expand its forest resource base through the use of hardwoods? What effect will the use of hardwoods for pulp manufacture have on the forest economy of the region? This article attempts to provide some of the answers to these questions.

THE PULP and paper industry has, in recent years, been going through a period of transition from which it has not fully emerged. This is true in the nation as a whole and in the New England area as well. Profound changes are taking place which involve the scrapping of many of the industry's previous concepts with respect not only to manufacturing processes but also to raw material supplies.

Fifty years ago per capita consumption of paper in the nation was only 50 pounds per year. The widespread substitution of wood for rags, straw and manila stock as a source of pulp had brought relief from raw material supply problems. The abundance of spruce, balsam fir and poplar in and near the northeastern states enabled them to retain a leading position in the industry.

Until 1925 the industry was able to meet the nation-wide demand for pulp and paper without resort to untried species of wood. This was in spite of a 400 per cent increase in paper and board consumption since 1900. The increase in annual consumption from 10 million to 20 million tons between 1925 and 1945, and the subsequent rise to 30 million tons, nearly 400 pounds per person, have, however, forced the industry to look to hitherto unused wood species as a means of widening its resource base. It has been left to the industry to find, on a sustained output basis, more wood in a month than used to be required in a year. This search has been accompanied by the development of new processes to make use of hardwoods and other species which the pulp industry formerly considered weeds.

The contribution of hardwoods to pulpmaking does not rest with the future. It is quite real at present with nearly four million cords of hardwood used in the United States in 1952 — a sizable industry in itself. The use of hardwoods would not have increased so rapidly had far-reaching shifts not occurred in the processes for converting wood to pulp and had there not been a mounting shortage in the over-all supply of pulpwood.

From the 1880's, when wood replaced rags, straw and manila stock as the principal source of fiber for the paper industry, until the 1930's when the kraft process was perfected for making sulphate pulps from southern pine, the pulp and paper industry resembled the tidy housekeeper, "with a place for everything and everything in its place." Spruce and balsam fir were the preferred species for groundwood and sulphite, poplar for soda pulp. Groundwood went heavily into newsprint, soda into coated book and magazine stock, the sulphites had the fine and other printing paper fields to themselves, and the comparatively new sulphate pulps supplied the coarse wrapping paper and containerboard markets. The processes themselves varied no more from mill to mill than did the wood specifications. The 1930's saw these tight molds begin to break down. The chart on page 2 shows by processes how radically the old proportions have been altered in the nation since 1929. In contrast we find that New England's pattern in 1953 bears a striking resemblance to that which the nation showed in 1929. Inasmuch as the pulp and paper in-

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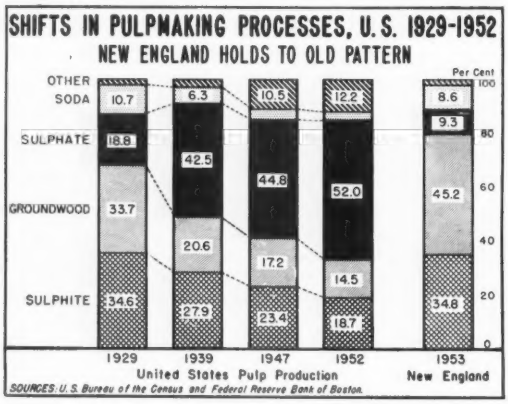
ALSO IN THIS ISSUE:

Employment in New England —
Part I—How Did Employment Change, 1947–1953? 4
Christmas Shopping Records Broken 8



dustry got its start here (with Maine the leading state in pulp production as recently as 1929) and since no new pulp mills were erected in New England after 1930, it is not surprising that 90 per cent of this region's capacity is still devoted to three original processes, groundwood, sulphite and soda. The New England mills have thus faced the dual problem of changing to new types of wood and of modifying their pulping processes.

To solve this problem, New England mills have increased their use of heavy hardwoods[2] substantially since 1929 as the chart on page 3 shows. The increase since 1929 in their use of heavy hardwoods reflects not only technological advances, such as those which encouraged the introduction of southern pines, but the intensive search for ways to broaden the industry's supply base to keep up with relentless increases in demand for paper and paperboard.

The chart on page 3 also shows that changes have taken place in recent years in the utilization of hardwood pulpwood by mills in New England. In order to determine the extent of these changes, the Federal Reserve Bank of Boston arranged in October 1953 for the mailing, to each New England pulp manufacturer, of a confidential questionnaire designed to provide the essential information.

Replies were received from 19 of the 20 companies to which the questionnaire was sent. They covered 34 of the 35 pulp mills known to be operating in New England at the present time. The returns represent 98.7 per cent of the region's total rated mill capacity. Complete information was supplied by all companies that made wood pulp from mixed hardwoods.

This questionnaire survey indicates that a very few mills account for almost all of New England's use of hardwoods for pulpmaking. It also shows that the sulphate and soda processes have been the largest users of hardwoods in New England, whereas sulphite and groundwood mills, particularly the latter, have only just begun to use hardwoods.

Hardwood pulp production in 1953 has been estimated at 367,000 tons, equivalent to 22 per cent of New England's total pulp production. Analysis of the individual returns indicates that probably as much as 317,000 tons were made from the heavy or mixed hardwoods (primarily birch, beech and maple). This represents a striking change from 1929 when Census data reported that only 25,000 cords of the heavy hardwoods were consumed by the pulp industry in New England, enough to make less than 20,000 tons of pulp.

The table below shows that the companies using hardwoods have not approached the matter in any tentative fashion but are already heavily dependent on use of this denser, shorter-fibered wood for their operations. In fact, of the five mills represented in the top group, two use hardwoods exclusively. Conversely, most of the mills in the less than 20 per cent group use no hardwoods whatever. The opportunity for greater utilization of hardwoods in New England pulpmaking clearly rests then with the 13 companies and their 24 mills where softwoods are still being used almost exclusively. Since such operations presently account for more than three-fifths of the region's total output of wood pulp, this opportunity is a considerable one.

HARDWOOD USE IS CONCENTRATED IN SMALL NUMBER OF MILLS
NEW ENGLAND — 1953

Proportion of Hardwood Pulp in Total Output	No. of Mills	Pulp Production* Thousands of Tons		Ratio of Hardwood Pulp to Total
		Hardwood	Total	Per Cent
51-100 per cent	5	219	297	74
21-50 per cent	6	132	306	43
0-20 per cent	24	16	1,040	2
Totals	35	367	1,643	22

*Estimates made by survey respondents and Federal Reserve Bank of Boston.

An attempt has been made to compare the several pulping processes with respect to their utilization of hardwoods. As was to be expected, the soda process, which had used poplar ever since the erection of the first mill in the 1870's and was the first to turn to the mixed hardwoods, proves to be heavily oriented toward hardwoods. That the sulphate process, in only five years' time, has converted more than 80 per cent of its pulp output to hardwoods is, on the other hand, a more surprising observation.

There has been some conversion of sulphite capacity to use of the neutral semi-chemical process. Even when the production by these two processes is combined, the total comes to less than 20 per cent. This lag may be explained by the fact that hardwoods are especially resistant to pulping by the acid sulphite process and that only in recent years has it been demonstrated that employment of ammonia and soda bases in place of calcium will overcome this difficulty, giving a product with properties very close to those of soda pulp.

Mills using the groundwood process have a special opportunity for hardwood utilization. This is of particular importance to New England where the process accounts for nearly half of the wood pulp produced. This field is literally wide open since the so-called chemi-groundwood process has been placed in the public domain by its sponsors, the Empire State Paper Research Associates. This process, which provides for pre-treatment of the round wood with mild chemicals, followed by conventional stone grinding, stems mainly from the pioneering research work done at the New York State College of Forestry. This research indicated that power consumption per ton of pulp is about

[2]Beech, birch, maple, oak, gum and others of comparable density.

HARDWOOD USE IS CONCENTRATED IN SODA AND SULPHATE PROCESSES
NEW ENGLAND — 1953

Pulping Process	Estimated Pulp Production			Estimated Hardwood Pulpwood Consumed
	Total	Hardwood	Hardwood Ratio	
	Thousands of Tons		Per Cent	Thous. Cords
Soda	142	118	83	195
Sulphite (& semi-chem.)	606	109	18	163
Sulphate	153	125	82	196
Groundwood	742	15	2	17
Totals	**1,643**	**367**	**22**	**571**

half that required for spruce and fir, exceptionally high yields are obtained and production rates achieved in grinding are higher.

Evidence that thoroughly practical results may be expected to attend use of this new process is provided by the $30 million expansion program which the Great Northern Paper Company is undertaking at the present time. Full-scale commercial production of hardwoods ground by this process, for blending into newsprint and possibly other grades of paper, is not scheduled to begin until late this year. Great Northern has, however, reported that its limited commercial production of about 50 tons per day bears out the laboratory and pilot plant findings. Since New England's groundwood capacity is relatively higher than that of any other region, the importance of Great Northern's leadership in this respect can scarcely be overestimated.

Other regions, notably the Lake and Appalachian States, appear to lead New England at the moment in the shift away from softwoods. Part of the reason may be that the shortage of softwood pulpwood has been less acute here. Early adaptation of the Lake States industry to the abundant supplies of aspen undoubtedly predisposed a favorable attitude toward the heavier hardwoods. Our survey indicates, however, that, excepting those using the sulphite and groundwood processes, the New England mills have not lagged in the move toward the heavier hardwoods. Possibilities of further expansion exist in the more than 200 nonintegrated paper mills in the Northeast to the extent that hardwood pulp can be adapted to their products.

The characteristics of hardwood pulp also throw light on their importance to the industry. A Maine manufacturer[3] of fine papers recently said that **hardwood pulps are excellent for giving opacity, bulk and good formation to fine papers. Although softwood pulps are necessary to contribute sufficient strength, the hardwood fibers play an important part in other characteristics. The cellulose content of hardwoods is, in general, higher than that of softwoods. This results in a higher yield per unit of weight of wood. Even more important economically is the greater density of the hardwoods which gives some 20 per cent more pulp from a cord of hardwood than from a cord of softwood.**

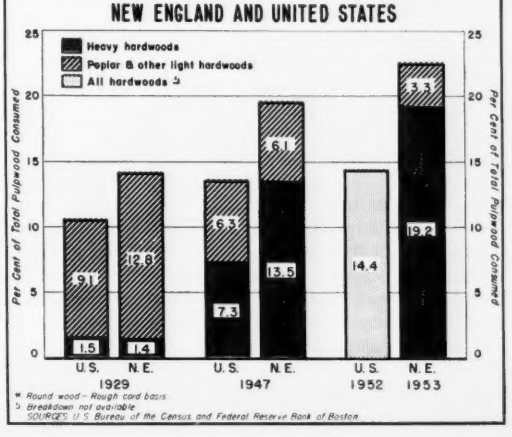
Our survey bears out the assertion that a cord of hardwood yields more pulp than a cord of softwood. The respondents who reported use of softwoods only for pulping by chemical processes consumed 2.00 cords of wood for each ton of pulp produced. The corresponding figure for chemical pulp from hardwoods was 1.52 cords. This higher yield compensates for some of the natural advantages the softwoods possess. They are easier to handle and transport. On the other hand, softwoods bring higher prices in the pulpwood markets.

More complete and more profitable utilization of the wood content of the log that has been brought out of the woods is a desirable objective. This objective is being effectively realized by a large New England user of hardwood pulpwood and one of the leading New England furniture manufacturers. Before the pulpwood goes to the pulp chipper, a sawmill removes the more valuable material suitable for furniture manufacture.

Fuller utilization of New England's forests, and particularly of their productive capacity under good management, is also a desirable objective. The use of hardwoods for pulp brings New England an opportunity to gain a double advantage. The demand for softwoods has always been greater in the region than for hardwoods. The consequent heavier cutting of softwoods has been resulting in a gradual increase in the proportion of hardwoods in the forest. While the market for hardwoods lagged, little could be done to correct this situation. With a market for hardwood for pulp, on the other hand, managers of forest properties are free to lay plans for future forest production with a hitherto severe restriction removed. If they want to grow more softwood they will at least not be hampered by inability to get the hardwood out of the way. And this greater freedom of action can have important results in increasing total forest productivity.

During the past 50 years New England's proportionate share of the nation's production of pulp and paper has steadily declined — from 30 per cent in 1914 to less than 10 per cent in 1952. Whether the broadening of the forest resource base through increased use of hardwood can result in a reversal of this trend in relationships depends on factors not now known. There can be little doubt, in any event, that modern techniques which make the pulping of New England's hardwoods a sound business undertaking have brought an opportunity for growth that deserves serious attention.

CHANGES IN USE OF HARDWOOD PULPWOOD*
NEW ENGLAND AND UNITED STATES



* Round wood – Rough cord basis
▷ Breakdown not available
SOURCES: U.S. Bureau of the Census and Federal Reserve Bank of Boston

[3] Harold Holden, President, Eastern Corporation, Bangor, Maine, in a paper presented at a meeting of the New England Council, November 1953.

Monthly Review
FEDERAL RESERVE BANK OF BOSTON

Employment in New England

Part I—How Did Employment Change, 1947-1953?

Recently published statistics facilitate a reappraisal of structural changes in New England employment. This article describes employment changes since 1947. It brings up to date previous analyses of New England's labor force and manufacturing employment in the *Monthly Reviews* for March and April 1947 and October 1949.

New England expanded its nonfarm employment significantly between 1947 and 1953, but only a small proportion of that increase was accounted for by increased manufacturing activity. Although growing economic areas with rising incomes may expect to devote increasing shares of their total working force to distributive and other service activities, New England's great dependence on manufacturing as a source of income requires that the region maintain a healthy rate of growth in manufacturing activities. More analysis is required to determine whether New England's manufacturing growth is adequate to preserve its growth in income.

Changes in New England's manufacturing employment since 1947 have been dominated by rapid contraction in the textile industry and more than offsetting expansion in metalworking activities. Those changes have affected workers' pay and the stability of their jobs. They also may reflect a more effective use of New England's most precious resource, its people. A succeeding article will analyze some of the effects of these employment changes and their implications for New England.

EMPLOYMENT of New England workers has changed markedly since 1947. The proportion of workers in farming activities has continued to fall. Although manufacturing employment has expanded, the growth in other nonagricultural occupations has been greater. The region's largest single manufacturing industry, textiles, has been affected greatly by the nation-wide contraction and southward movement of that industry. Other industries have expanded to help offset the loss of textile jobs and build up the region's manufacturing strength.

During recent years this employment transition, particularly in manufacturing activities, has been accelerated. The defense program has stimulated the growth of industries making munitions and other goods used by the military forces. Rapid expansion of industrial plant and equipment, partly due to the defense effort, has provided many orders for machinery manufacturers in New England. Scientific advances, again partly defense stimulated, have led to the establishment and growth of entirely new manufacturing activities. General business prosperity has supported the efforts of community and state development groups to accelerate industrial diversification.

New England has been both strengthened and weakened by these developments. Workers have been provided more jobs at good pay but it is possible that their employment may be less stable. Manufacturing activities have placed greater emphasis on product lines in which New England's ability to compete successfully with producers elsewhere seems to be stronger. Yet much of present manufacturing activity depends on the defense program.

These and other related developments are of great importance to New Englanders. They merit close examination. This article describes changes in employment of New England workers during the six-year period from 1947 to 1953.

Nineteen forty-seven was a good business year in New England and the nation. Unemployment was low, incomes were rising and in retrospect it is clear that the conversion from a wartime economy had been successful. A study of employment statistics made that year revealed that total nonfarm employment in New England had increased 28 per cent since 1939.

The 1947 study also showed that manufacturing employment in the region had accounted for more than half of the expansion. This reversed the downward trend in manufacturing employment which had occurred in the 20 years before 1939. Every industry except the leather and tobacco categories employed more workers in 1947 than in 1939. But manufacturers of hard goods, led by the machinery, fabricated metal products, electrical machinery, and transportation equipment industries, made the greatest gains.

Statistics recently published by the U. S. Bureau of Labor Statistics permit detailed analysis of changes in nonfarm employment in New England in the years since 1947. Comparisons between 1947 and 1953, both years of generally good business, highlight significant changes in the region's employment pattern.

Total Nonagricultural Employment

Total nonagricultural employment in New England expanded by 226,800 in the six years since 1947, to reach a new peak of 3,524,000 in 1953, an increase of seven per cent. Manufacturing industries gained 37,000 workers, only 16 per cent of the total. Nonmanufacturing activities added workers more rapidly, expanding their payrolls by 190,000. Trade and service industries and government units tend to claim a larger proportion of the total work force as the economy of a region gradually becomes more fully developed and as income levels rise. The proportion of New England's nonagricultural workers engaged in manufacturing declined from 46.4 per cent to 44.4 per cent during this period. More analysis is needed to determine why manufacturing activities registered only one-sixth of the net gain in nonagricultural employment.

Local, state and Federal government agencies in New England added more workers between 1947 and 1953 than any other category of nonagricultural employment. State and local government organizations expanded slightly more rapidly than did the Federal government. They added nearly 59,000 workers. An accompanying table presents the employment changes

in other major categories of nonagricultural employment between 1947 and 1953.

Changes in nonfarm employment were neither uniform nor uninterrupted over the six-year period from 1947 to 1953. Total nonagricultural employment declined only in 1949. This loss of jobs was more than recovered by 1951. A fairly steady demand for workers from nonmanufacturing sources helped offset more marked changes in demand for factory workers between 1947 and 1953. The total number of nonmanufacturing employees increased in every year, even though the gains in 1949 and 1953 were quite small.

The number of workers employed by factories in New England declined slightly in 1948 as some shortages arising from demands deferred during World War II were filled and as inventory troubles began to appear. In 1949, manufacturing employment showed a much larger decrease. The size of New England's factory payrolls shrank about 10 per cent during 1949.

Manufacturing industries were making steady gains in 1950 before the Korean War. The outbreak of hostilities in Korea gave added vigor to the upward movement. About 80,000 workers were hired by New England manufacturers in 1950 and an additional 96,000 took jobs in factories the following year. Most of the build-up required for meeting defense contracts had been made by 1952, and reductions in work forces by textile and other nondurable-goods industries more than offset additional gains made by manufacturers of hard goods. The year 1953 saw a new high in employment.

State Employment Changes

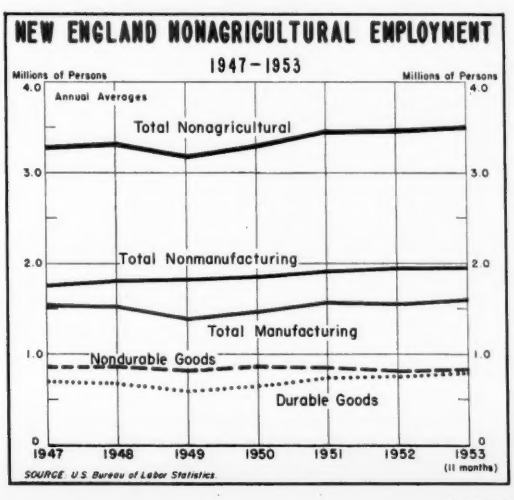
Changes in employment also varied within New England from state to state and from area to area between 1947 and 1953. Every New England state had a larger number of persons at work in 1953 than in 1947. Connecticut registered the most rapid advance, increasing its nonagricultural work force 13.4 per cent by adding 99,000 workers. Maine made the second largest percentage increase, and was followed in sequence by Massachusetts, New Hampshire, Vermont and Rhode Island.

Differences in the industrial structures of the various New England states and the economic conditions affecting the dominant industries largely explain differences in employment experiences from state to state. Connecticut and Vermont depend more heavily upon durable-goods industries than do the other New England states. Durable-goods manufacturers enjoyed more favorable business than did soft-goods industries between 1947 and 1953, both in the United States and in New England. Defense demands, high levels of residential and industrial construction, large plant and equipment modernization programs and other factors helped stimulate the durable-goods industries. As a result, Connecticut enjoyed by far the most rapid increase in manufacturing employment between 1947 and 1953, and Vermont registered the second largest percentage gain.

NEW ENGLAND NONAGRICULTURAL EMPLOYMENT
1947 and 1953 (in thousands)

	1947	1953*	Per Cent Change
Total Nonagricultural Employment	**3296.3**	**3523.7**	**+ 6.9%**
Manufacturing	1528.2	1565.1	+ 2.4
Nonmanufacturing	1768.1	1958.6	+10.8
Trade, Wholesale and Retail	612.9	666.4	+ 8.7
Government	336.5	417.4	+24.0
Service and Miscellaneous	339.2	368.2	+ 8.5
Transportation and Public Utilities	224.8	213.4	− 5.1
Finance, Insurance and Real Estate	128.5	155.7	+21.2
Contract Construction	126.2	137.4	+ 8.9

*Average for first 11 months.
Source: U. S. Bureau of Labor Statistics New England Regional Office.



Connecticut also made a larger absolute gain in manufacturing employment between 1947 and 1953 than any other New England state. This was largely due to the heavy concentration of aircraft manufacturers in Connecticut. Aircraft plants more than doubled their work forces between 1947 and 1953. Manufacturers of fabricated metal products, rubber products, ordnance and instruments also showed substantial employment gains. Connecticut's expanding industries more than offset employment declines in the textile, leather goods and primary metal industries. Large employment gains in wholesale and retail trade and in the construction and finance categories also contributed to Connecticut's high rate of growth in nonagricultural employment.

Nonmanufacturing activities were mainly responsible for the 90,300 gain in nonfarm employment in Massachusetts. Government agencies added 53,300 workers between 1947 and 1953. The wholesale and retail trade, finance and service categories also added a substantial number of workers, which more than offset declines in the transportation and construction industries.

The electrical equipment industry showed by far the greatest gain in employment among the manufacturing industries in Massachusetts. A large number of new electronics plants were started and other makers of electrical apparatus expanded output. The transportation equipment, apparel, and furniture and fixtures industries also expanded. Employment gains registered by these industries more than offset a loss of 31,000 jobs in textiles, and smaller losses in the leather and the lumber and wood products industries in Massachusetts.

Most of the nonagricultural employment gains in Maine and Vermont were also due to increases in non-

manufacturing categories, although manufacturing employment in both states in 1953 exceeded that in 1947 by small amounts. Both states experienced declines in employment in the textile industry. Maine relied mostly on other nondurable-goods industries, principally leather and shoe plants, to offset the loss of textile jobs. In Vermont, the major gains were in durable-goods employment, led by the machine tool industry.

New Hampshire and Rhode Island showed gains in total nonfarm employment between 1947 and 1953 despite small losses in manufacturing jobs. New Hampshire suffered a net decline of 500 manufacturing jobs. A loss of 5,600 textile jobs was nearly offset by gains registered by the electrical machinery industry, which grew very rapidly. Wholesale and retail establishments also added many workers in New Hampshire.

Rhode Island's loss of 16,900 textile jobs was not entirely made up by increases in employment in the nonelectrical machinery, rubber and other manufacturing industries. As a result, manufacturing plants in Rhode Island offered 6,900 fewer jobs in 1953 than 1947. Substantial increases in nonmanufacturing categories, led by the construction industry, however, more than offset losses in manufacturing. As a result, Rhode Island's nonfarm employment in 1953 exceeded the 1947 figure by 11,300.

Changes in New England Manufacturing Employment

Most employment in distribution and service industries is supported by other more basic activities. Manufacturing is the major method of income generation in New England. The region must continue to have a large number of stable manufacturing jobs to maintain high income levels. The record of manufacturing employment changes provides the key to New England's continued ability to achieve high incomes.

The outstanding characteristic of manufacturing employment in New England during 1947 was its concentration on nondurable-goods industries and, even more particularly, its dependence on the textile and leather industries. The region's reliance on these industries was lower in 1947 than in earlier years, but it was still very high. In 1947, 45.2 per cent of the nation's factory workers were in nondurable-goods industries. At the same time, New England employed 55.4 per cent of its factory workers in nondurables.

In the years since 1947, New England's employment structure became more like the nation's. Dependence on nondurable-goods industries dropped to 51.1 per cent of all factory workers in 1953 in comparison with 41.4 per cent for the nation.

The changing pattern of employment in New England resulted from a combination of employment contracting in the textile industry at a rate greater than in the nation, a lack of expansion in the leather industry, and expanding employment in durable-goods industries which acted to offset the losses. New England's textile industry contracted employment by 68,200 persons between 1947 and 1953. Other nondurable industries added 21,700 workers so that the net contraction for the group was 46,500. The actions of hard-goods manufacturers in creating 83,400 new jobs more than offset those losses and established a net gain of 36,900 for the whole manufacturing category.

The relatively rapid shift from nondurables to durables in New England between 1947 and 1953 was partly due to abnormal demands arising from the Korean War. Most government contracts have been concentrated in the durable-goods industries. If defense contracts decline and other pent-up demands for hard goods which accumulated during World War II become fully satisfied, there may be a decline in the relative importance of durable-goods industries.

The change to greater dependence on durable-goods industries also reflects the continued shift of the country and the region to a metals-based economy. Metalworking industries expanded employment by 13.7 per cent in New England between 1947 and 1953. Employment in other durable-goods industries exceeded 1947 figures by only 2.4 per cent.

New England's relative advantages for various types of manufacturing are also partly responsible for the shift from nondurable- to durable-goods industries. The manufacture of textiles, leather goods and other nondurables in this country received its start in New England. The region has long been in the forefront in the production of these and other soft goods. But as other regions of the country became more fully developed, it was found that many soft goods could be made at competitive or even lower prices in these areas. Southern and western agricultural regions had larger untapped supplies of labor as well as a more rapidly growing population from which to draw work forces. Nearness to markets or raw materials and other locational factors gave concerns in other regions a competitive advantage over some New England manufacturers.

The growth of durable-goods industries in New England is encouraging evidence that the region still offers important advantages for many forms of manufactur-

ing. Many makers of such items as machinery, electrical apparatus and aircraft have recently started or expanded operations in New England because workers here had acquired skills that cannot be found elsewhere. The machinery industries have also found New England locations an advantage because of the region's nearness to large domestic and foreign markets. The many research organizations and universities in New England have helped attract manufacturers of instruments, plastics, electronic devices and other products requiring considerable technical knowledge.

An accompanying table compares rates of change in manufacturing employment between 1947 and 1953 in the various New England states with the proportion of each state's factory workers in the durable-goods industries. The table shows that the states with the highest proportions of workers in the durable-goods industries generally enjoyed the most rapid advances in manufacturing employment.

All New England states except Maine showed relative changes in manufacturing employment which corresponded with the proportion of its workers engaged in durable-goods industries. Maine's experience was largely due to increases in shoe and leather employment. Many plants in this industry transferred operations to smaller Maine communities from larger cities between 1947 and 1953, primarily because of differential wage rates and labor conditions. Rhode Island was the only New England state that depended more heavily on nondurable-goods industries in 1953 than in 1947, and it was also the only state which showed a marked decline in factory employment.

Apparently durable-goods manufacturers find New England locations more advantageous than do nondurable-goods manufacturers. These findings suggest that New England should look primarily to hard-goods industries to increase its manufacturing work force and to raise its income level. On the other hand, employment in durable-goods industries tends to fluctuate more widely than nondurable-goods employment during cyclical changes. More detailed analysis in the succeeding article will clarify the relationships between type of industry and cyclical fluctuations.

Industry Employment Changes

An accompanying chart portrays the relative importance of manufacturing industries in New England in terms of employment, and shows the major changes that have taken place since 1947. As noted earlier, the textile industry still employs more New England workers than any other single classification of manufacturing industry. But if electrical and nonelectrical machinery were grouped together, in the same manner that cotton and other textile manufacturers are, the machinery industry would be by far the largest employer. In a very real sense, however, the textile industry dominates employment changes in New England because of its rapid contraction in recent years.

Gains in the transportation equipment and electrical machinery industries in New England more than offset the loss of textile jobs. The transportation equipment industry added 46,500 workers and electrical machinery manufacturers 28,800 between 1947 and 1953. The electrical machinery industry became the third largest employer of factory workers in New England in 1953. It was the fifth largest employer in 1947.

GROWTH OF MANUFACTURING EMPLOYMENT AND RELATIVE IMPORTANCE OF DURABLE GOODS IN THE NEW ENGLAND STATES

State	Per Cent of Manufacturing Workers in Durable-Goods Industries in 1953	Increase in Manufacturing Employment 1947-1953
Connecticut	68.9%	+8.7%
Vermont	62.8	+2.0
Massachusetts	43.0	+0.8
New Hampshire	34.8	−0.6
Maine	32.5	+1.2
Rhode Island	28.1	−4.5

Sources: U. S. Bureau of Labor Statistics.
State Labor Departments and Employment Security Divisions.

The very rapid advance in employment in the transportation equipment industry caused this industry to become the sixth most important New England employer in 1953. In 1947, the industry ranked eleventh in order of importance. The transportation equipment industry is one of the few industries which grew more rapidly in New England than in the nation between 1947 and 1953. New England firms in this industry increased their payrolls by 84.5 per cent, while those in the country as a whole expanded an average of 50.6 per cent. The industry's needs for a high level of manufacturing skill and relatively small amounts of power make it well suited to New England.

The nonelectrical machinery industry retained its place as the second largest New England employer, even though the number of workers in this broad category declined by 1,200 between 1947 and 1953. Depressed conditions in the textile machinery industry, over half of which is concentrated in New England, was the main reason for the loss in total jobs in the nonelectrical machinery category. Other makers of machinery, particularly metalworking machines, expanded employment.

The leather and leather products industry fell from the third largest to the fifth largest New England employer between 1947 and 1953, mainly because employment in the industry fell slightly while that in the electrical machinery and fabricated metal products industries increased. Although the New England shoe and leather industry offered 700 fewer jobs in 1953 than in 1947, New England plants in this industry did better than most manufacturers of leather and leather products in the nation. Employment in the industry fell by 4.9 per cent in the country as a whole between 1947 and 1953, but by only 0.6 per cent in New England.

Most other New England industries retained the same relative position in 1953 that they had in 1947. The ordnance, furniture and fixtures, instruments and apparel industries displayed the highest rates of employment growth over the period.

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Monthly Review
FEDERAL RESERVE BANK OF BOSTON

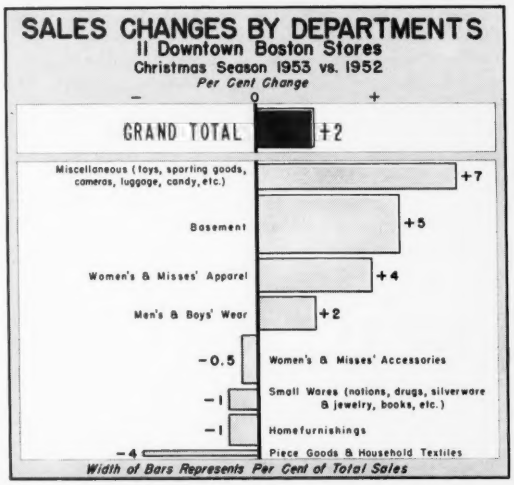
Christmas Shopping Records Broken

NEW ENGLAND department stores attained a new record dollar volume of sales in the 1953 Christmas shopping season, three per cent higher than the previous record set last year. For the fourth year in a row, heavy last-minute buying pushed Christmas sales volume above that of the preceding year. The favorable year-to-year gain was also partly dependent upon an additional shopping day in Christmas week this year.

The season started somewhat ominously as sales for Thanksgiving week fell three per cent below those for the similar week of 1952. Improved sales volume in the next two weeks had barely overcome this deficit when retailers suffered a severe setback from a very stormy Monday, December 14. The storm made it impossible for many stores to equal last year's sales figures for the corresponding week. As a result, the success or failure of the season depended upon the sales of the last few days. The story has a happy ending since a large volume of purchasing had been postponed to the end of the Christmas shopping season again this year. Sales in Christmas week, bolstered by the extra shopping day, climbed 16 per cent above those of a year ago and pushed dollar volume for the five-week period three per cent ahead of sales in the same period of 1952.

All cities and areas for which weekly sales figures are available recorded increases over Christmas season sales in 1952. The "Other Southern New England" group, which includes stores in New Haven, Worcester and Brockton, registered the largest gains, averaging six per cent for the five-week period shown in the accompanying table. It was the only group that matched or bettered last year's figures every week during the period. Stores in the suburban areas of Boston rang up the second largest increase over year-earlier figures with a sales gain of five per cent. Year-to-year gains in other areas ranged from two to four per cent.

The year-to-year gain in Christmas season sales was less for Downtown Boston stores than for stores in the suburban areas of Boston. The comparative gain was also less for Downtown Boston stores last year. Consumers seem to be showing a growing preference for shopping in the relatively less crowded conditions nearer home. On the other hand, the Downtown Boston stores were the only group whose sales remained above year-ago levels during the "stormy Monday" week of December 19. During the last week of the season, however, the relative sales gain for Downtown Boston stores was the smallest of the various groups. Apparently more last-minute shopping was done in the suburban areas.



Christmas shoppers were apparently more price conscious this year than last. Basement sales in Downtown Boston stores recorded a five per cent gain from year-ago levels, while the gain for the entire store was only two per cent. The increased bargain-consciousness appeared to be a continuation of the November experience when the basement showed a four per cent gain in sales from those of November 1952. Total basement store sales for the first eleven months of 1953 were the same as for the corresponding period of 1952.

Among the principal store divisions, the largest year-to-year increase in sales during the Christmas season occurred in the group of "miscellaneous" merchandise departments which include such items as toys and games, sporting goods, cameras, luggage and candy. Sales of these departments increased by seven per cent. Within the group, sales of toys and games recorded an eleven per cent gain over the Christmas season sales of 1952. This year relatively greater emphasis was placed on gifts of a personal nature than on those for the home, as shown in the accompanying chart. Sales volume in both the homefurnishings and the piece goods and household textiles departments compared less favorably with that of a year ago than did sales in other departments. The four per cent increase in sales of women's and misses' ready-to-wear apparel was aided by the sharp gain of eleven per cent in sales of girls' and teen-age wear.

The record volume of sales of New England department stores during the 1953 Christmas shopping season was reassuring to area merchants concerned over prospects for 1954 business. The popularity of the basement store during the period, however, seems to indicate that stepped-up promotional effort may be required to attain desired sales levels during the coming months.

COMPARISON OF CHRISTMAS SEASON SALES
50 NEW ENGLAND DEPARTMENT STORES

Corresponding Weeks 1953 vs. 1952

City or area	Per cent change 1952 to 1953					
	Weeks ending in 1953					Five week total
	Nov. 28	Dec. 5	Dec. 12	Dec. 19	Dec. 26*	
Downtown Boston	−5	+1	+1	+1	+13	+2
Suburban Boston	+5	+9	+2	−4	+21	+5
Cambridge (included in Suburban Boston)	+4	+2	−2	−6	+18	+2
Lowell-Lawrence	−8	+6	+5	−4	+20	+4
Springfield	−1	+1	+4	−3	+15	+3
Providence	−3	−2	+2	−4	+20	+2
Other Southern N. E.	+1	+4	+6	0	+25	+6
Total — All Stores	−3	+2	+2	−1	+16	+3

*Five shopping days in each year; four pre-Christmas shopping days in 1953, three pre-Christmas shopping days in 1952.